Claims:

1.   Method for reducing cross-talk in a communications system comprising a plurality of transmitters for transmitting encoded data signals via

5   respective communications channels, said method comprising:

processing a first encoded data signal according to at least one pre-coding matrix to produce a first pre-coded signal, each of said at least one pre-coding matrices having associated with it a respective encoded data signal;

10   communicating said first pre-coded signal to a respective first communication channel; and

adapting said at least one pre-coding matrices in response to an impairment indicative signal;

said processing tending to offset channel impairments within said first

15   communications channel.

2.   The method of claim 1, further comprising:

receiving said first pre-coded signal from said first communications channel; and

20   generating said impairment indicative signal in response to a determination of a channel impairment level of said first communications channel.

3.   The method of claim 2, wherein said impairment indicative signal is

25   determined according to a least mean square (LMS) algorithm.

4.   The method of claim 1, wherein signals propagated via said communications channels comprise in-phase (I) and quadrature (Q) signals forming carrierless amplitude and phase (CAP) modulated signals.

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5.   The method of claim 1, wherein signals propagated via said

communications channels comprise in-phase (I) and quadrature (Q) signals forming quadrature amplitude modulated (QAM) signals.

6.   The method of claim 1, further comprising:

5   selecting, as initial parameters of said at least one pre-coding matrix, a set of parameters tending to offset said channel impairment of said first communications channel, said step of selecting initial parameters comprising the steps of:

            determining initial parameters of said at least one pre-coding

10   matrix prior to processing said first encoded data signal, said initial parameters of said at least one pre-coding matrix determined according to the steps of:

            propagating a pre-defined training sequence via said first communications channel;

15   receiving said pre-defined training sequence from said first communications channel; and

            determining, using said received pre-defined training sequence, a channel impairment of said first communications channel.

20 7.   The method of claim 4, wherein said step of adapting comprises:

            increasing an amplitude level of said at least one set of said I and Q signals; and

            repeating said steps of processing and communicating until said impairment indicative signal is less than a threshold level.

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8.   The method of claim 1, wherein said communications system comprises N transmitters, where N is an integer, each of said N transmitters performing said steps of processing, communicating and adapting using respective encoded data signals.

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9.   The method of claim 8, wherein each of said N transmitters processes

an encoded data signal according to N-1 pre-coding matrices, each of said N-1 pre-coding matrices being associated with a respective encoded data signal from the other transmitters.

5   10.   The method of claim 8, wherein each of said N transmitters processes an encoded data signal according to N pre-coding matrices, each of said N pre-coding matrices being associated with a respective encoded data signal from each of the N transmitters.

10   11.   The method of claim 8, wherein:

   each of said N transmitters performs the step of selecting initial parameters for respective at least one pre-coding matrices, said selected initial tending to offset channel impairments of said respective communications channels, said step of selecting initial parameters

15   comprising the steps of:

      determining initial parameters of said at least one pre-coding matrix prior to processing a respective encoded data signal, said initial parameters of said at least one pre-coding matrix determined according to the steps of:

20   propagating a pre-defined training sequence via a respective communications channel;

      receiving said pre-defined training sequence from said respective communications channel; and

      determining, using said received pre-defined training sequence,

25   a channel impairment of said respective communications channel.

   12.   The method of claim 6, further comprising the step of training an equalizer to reduce channel-specific impairments from said received pre-defined training sequence prior to selecting said initial matrix parameters.

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   13.   The method of claim 11, further comprising the step of training an